Cornell Institute for Public Affairs
Graduate Professional Report

How Do the Academia and Donor Community Address Food Insecurity in Sub-Saharan Africa?

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Abstract

Sub-Saharan Africa has remained the world's most food insecure region for decades. Therefore, the paper first identified the key drivers of the current food insecurity in the region, followed by an analysis of how academia and donor community address the problem. At last, whether donor community's policies and approaches match what proposed by the academia were discussed. The paper found in general the two sectors' solutions correspond to each other, with both of them paid attention to the environmental sustainability in their work.

Key Words

Food Security, Sub-Saharan Africa, Academia, Donor Community

1. **Context**

The Global Environment Facility (GEF), an international organization that promotes sustainable development, is currently trying to combat environmental degradation in a more integrated way so that impacts could be generated on a broader scale. To achieve this goal, GEF carried out the Integrated Programs (Integrated Approach Pilots), under which there are three programs--Fostering Sustainability and Resilience for Food Security in Sub-Saharan Africa, Sustainable Cities, and Taking Deforestation out of Commodity Supply Chains. This paper is written under the context of the GEF IAP Food Security Program.

The GEF IAP Food Security Program is led by the International Fund for Agricultural Development (IFAD). The program is still in the design phase and is intended to work on strengthening institutional frameworks, scaling up existing sustainable practices, and monitoring global environmental benefits in twelve Sub-Saharan African countries, respectively Burkina Faso, Burundi, Ethiopia, Ghana, Kenya, Malawi, Niger, Nigeria, Senegal, Swaziland, United Republic of Tanzania and Uganda.[1] The program received $106 million in funding from GEF, with an additional $805.36 million co-financed by governments, development agencies, foundations, international organizations, and the private sector.[2] The duration of the program is five years, from 2016 to 2020.

[1] Program Website: https://www.thegef.org/gef/IAP_Food-Security

[2] Source: http://ifad-un.blogspot.com/2015/06/ifad-lead-agency-on-new-gef-programme.html

2. Background

2.1 Food Security in Sub-Saharan Africa

Food security, conceptually defined in the World Food Summit of 1996, is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO 2002). There are four main dimensions of food security: 1) Availability that addresses the "supply side" of food security; 2) Access that denotes the affordability and allocation of food, as well as the preferences of individuals and households; 3) Utilization that denotes the way human body makes the most of various nutrients in the food; 4) Stability that represents the ability to obtain food over time (FAO 2008; Gregory, Ingram, and Brklacich 2005).

Sub-Saharan African countries have been suffering from food insecurity for a long period of time (Sanchez and Swaminathan 2005). The International Food Policy Research Institute (IFPRI) calculates the Global Hunger Index (GHI) scores every year to analyze the progress in hunger reduction. The GHI scores are based on four indicators, respectively, under-five mortality rate, prevalence of wasting in children, prevalence of stunting in children, and the proportion of undernourished people. As shown in Figure 1, although Sub-Saharan Africa's food security has been improving since 1990, it remains the most food insecure region in the world (Von Grebmer et al. 2015). According to Figure 2, the severity of hunger of most Sub-Saharan African countries were categorized as serious, which is consistent with the Global Food Security Index published by the Economist Intelligence Unit. Different from the GHI, the

Global Food Security Index analyzes food affordability, availability, and food quality and safety. As shown in Figure 3, except for South Africa and Botswana, all the other Sub-Saharan countries were categorized as moderate performance or needing improvements. (Alarcon et al. 2015).

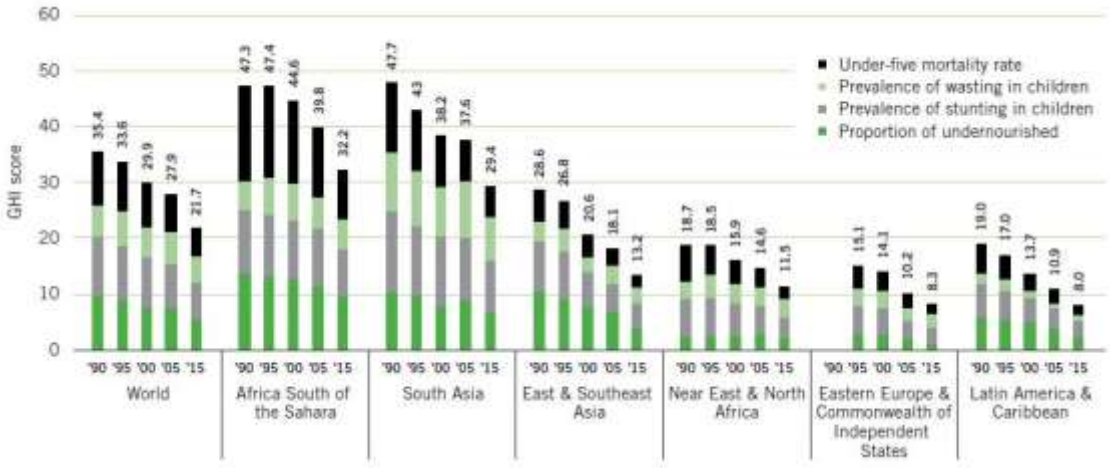

Figure 1. Developing World and Regional 1990, 1995, 2000, 2005, and 2015 Global Hunger Index Scores, with Contribution of Components[3]

Figure 2. 2015 Global Hunger Index[4]

Figure 3. Global Food Security Index[5]

[3] Source: Von Grebmer, Klaus; Bernstein, Jill; de Waal, Alex; Prasai, Nilam; Yin, Sandra; Yohannes, Yisehac. 2015. 2015 Global hunger index: Armed conflict and the challenge of hunger. Bonn, Germany; Washington, D.C. and Dublin, Ireland: Welthungerhilfe; International Food Policy Research Institute (IFPRI) and Concern Worldwide.

[4] Source: 2015 Global Hunger Index. (n.d.). Retrieved May 17, 2016, from http://ghi.ifpri.org

[5] Source: The Global Food Security Index. (n.d.). Retrieved May 2, 2016, from http://foodsecurityindex.eiu.com/

2.2 Drivers of Food Insecurity in Sub-Saharan Africa

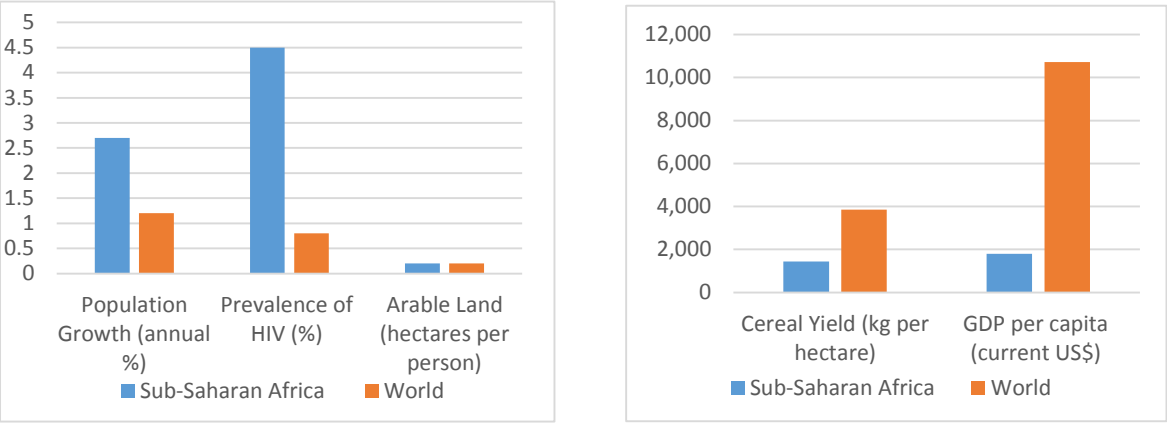

Figure 4. Summary of Selected Indicators of Sub-Saharan Africa Average and the World Average

Poverty Poverty is one of the main drivers of food insecurity in Sub-Saharan Africa. Figure 4 reflects a huge economic gap between the GDP in Sub-Saharan African countries and the world average. The poverty in Sub-Saharan is not only widely spread, but also persistent, which has a much stronger impact on food insecurity than the transient poverty (Mahadevan and Hoang 2015). Persistent poverty not only makes people lack capacity to purchase food or acquire inputs to produce food themselves (such as seeds, fertilizers, etc.,), but also has a serious negative impact on local health and education, which in turn affects local capacity to enhance food security. By analyzing 230 households in Nigeria, Adewuyi and Yusuf (2011) found a negative relationship between household food consumption and its poverty status. Also, the majority of the poor live in the rural area, relying on subsistence farming for food (Hertel and Rosch 2010). What is worse, an estimate of 48% increase in rural population density with shrinking farm size is expected in the next 35 years, putting further pressure to local income and food security (Shelton 2014).

Poor Health Conditions Even though urbanization has occurred in Sub-Saharan Africa, agriculture, especially small scale farming, remains the main source of income for local people. Since mechanization is still limited in the area, agricultural productivity largely relies on the availability and productivity of human labor (Fink and Masiye, 2015). As health conditions of most people in sub-Saharan Africa remains poor, local labor effectiveness cannot reach its full potential, which constrains agricultural productivity and transfers to local food insecurity (de Waal and Whiteside 2003). As suggested in Figure 4, Sub-Saharan countries have a higher HIV prevalence rate than the world's average. Gill's study (2010) showed that for an adult male contracting HIV, the value of the household overall production declined by 30%. Moreover, since HIV prevents body's absorption of nutrients, people living with HIV need higher nutritional intake--30–50% more protein intake and 15% more energy intake (de Waal and Whiteside 2003).

Unfavorable Agro-ecological Conditions Sub-Saharan Africa has a wide variety of climate zones. Among them, large area (the Sahel, Horn of Africa, Kalahari Basin, etc.) can be categorized as arid or semi-arid area where the agro-ecological conditions are not favorable for agricultural production (Reynolds et al. 2015). The soil fertility in Sub-Saharan Africa is low and with a high annual depletion rate which is a major biophysical cause of low per capita food production in Africa (Sanchez 2002). During 1970s to 2000s, the annual depletion rate in 37 African countries was 22 kg of nitrogen, 2.5 kg of phosphorus and 15 kg of potassium per hectare of cultivated land, which was equivalent to U.S. $4 billion in fertilizer (Bationo et al., 2012).

Climate Change What is worse, climate change has exacerbated the situation by increasing temperature, expediting soil degradation, and reducing water availability (Kotir 2011). According to the latest IPCC report, Africa is the world's most vulnerable region to climate change. Temperatures are likely to increase between 1.5-4 ℃ in this century, resulting in a yield reduction of up to 50% and an as much as 90% decline in crop revenue by 2100 based on projections (IPCC 2014). Unlike developed countries, Sub-Saharan African countries have limited capacity for climate change mitigation and adaptation, making the region much more vulnerable to food availability. According to Springmann et al. (2016), climate change could lead to an average of 3.2% (99 kcal per person per day) reductions in food availability by 2050, resulting in around 529000 extra deaths, unless action is taken.

According to CGIAR's study, Africa will have shorter, warmer and drier agricultural seasons by 2050, affecting tens of millions of smallholder farmers in Sub-Saharan Africa. When the average maximum temperature is higher than 30 ℃, yields of rice and maize will be affected, while cultivating beans will be very difficult. Although some farmers have already modified their sowing periods or changing grazing lands to adapt to climate change, the CGIAR's study suggested current efforts are far from enough. At the end of 2015, due to the El Niño phenomenon, severe droughts have affected several countries in the Horn of Africa and Southern Africa and are projected to continue to affect the region throughout 2016 (Nkunzimana et al. 2016).

Poor Institutions and Infrastructure Most Sub-Saharan African countries do not have well-functioning institutions and regulations in ensuring food security. Corruption, which is prevalence in the region, leads to inefficiency and leakage in food aid. At the same time, the

poor infrastructure (lack of roads) in the region prevents farmers' access to market, limiting people's access to food. The share of paved roads in Sub-Saharan Africa is only 18%, compared with 33% in Latin America and 59% in South Asia (Ozor, Umunnakwe, and Acheampong 2013). Additionally, the under-developed and under-regulated market obstructs product flow between the food surplus and food deficit areas, contributing to the failure of delivering food at affordable prices (Devereux 2009).

Insufficient Policies and Poor Implementation of Existing Ones Most Sub-Saharan African countries do not have national policies that specifically address food security. In most cases, food security policies are incorporated within agricultural policies. However, they are very weak and many of which don't have a complementary regulatory framework, action plans and functioning implementing agencies (Ozor, Umunnakwe, and Acheampong 2013). Also, although there are policies supporting research and innovations, due to the lack of capacity, poor infrastructure, or lack of political goodwill, they are not well implemented. Established in 2003, the Comprehensive African Agriculture Development Program (CAADP) is Africa's policy framework for agricultural transformation, wealth creation, food security and nutrition, economic growth[6]. However, after more than ten years, many participating countries still fall behind CAADP's target which is to achieve a 6 percent growth in agriculture by allocating at least 10 percent of each country's national budget to agriculture. Up to 2013, only Burkina Faso, Cape Verde, Malawi, Chad, Ethiopia, Mali, and Niger have met the requirement (Ozor, Umunnakwe, and Acheampong 2013).

[6] Source: About CAADP. (2015, October 12). Retrieved May 2, 2016, from http://www.nepad-caadp.net/about-us

Other Other factors contributing to the food insecurity in Sub-Saharan Africa include political instability, information failure, lack of education, and gender inequality, etc. (Jappah and Smith 2012).

3. Addressing Food Insecurity in Sub-Saharan Africa from an Academic Perspective

Academia has been playing an important role in enhancing food security in Sub-Saharan Africa as it provides scientific evidence and guidance to policy makers on how to address the issue effectively. In the academic community, there are many discusses on how to alleviate food insecurity, and below are the three most important ones.

3.1 Should Sub-Saharan Africa Replicate the Asian Green Revolution?

After the success of the Asian Green Revolution in the late 1960s, there has been considerable debates over whether to replicate the Green Revolution in Africa. Although limitations have been seen in the Green Revolution led growth strategy, the rapid food productivity growth in Asia generated positive impact (Pingali, 2012). Wik et al.'s study (2008) indicated that even though Asian population had more than doubled from late 1960s to early 2000s, the production of cereal crops tripled with only a 30% increase in land area cultivated. The success of the Asian Green Revolution was due to the adoption of the high-yielding crop varieties, land expansion, intensified input use (Evenson and Gollin, 2003), as well as funding provided by international agencies in crop research, infrastructure, and market development (Basu and Scholten, 2012; Pingali, 2012, Rashid et al. 2013).

Supporters claim that Green Revolution is transferable and should replicate to Africa

(Sanchez, Denning, and Nziguheba 2009). Since agricultural yields in Africa are far below their fullest potentials and the use of modern inputs such as fertilizer and irrigation systems are much less than that of other parts of the world, Africa has large potentials for a green revolution (Breisinger et al. 2011, Johnson, Hazell, and Gulati 2003). Both Kofi Annan[7] and Jacques Diouf[8], claimed that the Green Revolution is the way for Africa to get out of poverty and hunger. The region has already had the scientific and technological tools required to achieve the revolution. However, the African Green Revolution must be homegrown, with supporting infrastructure, incentives, innovation and institutions (Africa News Service 2007, Otsuka and Kalirajan 2006).

By contrast, numerous critics argue that there are not favorable conditions in Africa for the Green Revolution. Unlike Asia, which has only limited number of staple crops, Africa has a mix of crops grown in the region (Evenson and Gollin 2003). Although Africa's adoption rate of the improved crop varieties was about the same as Asia during the late 20th century, increases in food yields in Africa have lagged far behind. In Africa, improved crop varieties only contributed to a 28% crop yield improvement, compared with that of about 80% in Asia (Sanchez and Swaminathan 2005). This is because African's soil is significantly different from those of the Green Revolution of Asia. During the Green Revolution, the largest increase in yield in Asia was seen mostly on volcanic soils and in alluvial valleys where the soils are nutritious. However, in Africa, the types of soil are of a different origin and have developed from crystalline bedrock. Moreover, African soils vary greatly spatially. Therefore, to achieve

[7] Kofi Annan served as the United Nations Secretary-General from 1997 to 2006.

[8] Jacques Diouf served as the Director-General of the United Nations Food and Agriculture Organization (FAO) from 1994 to 2011.

yield potentials in Africa, different fine-tuned and site-specific fertilizer compositions and doses may be required even at adjacent locations (Voortman, 2013).

In addition to Sub-Saharan Africa's unfavorable soil conditions, the Asian Green Revolution also had drawbacks. The methods and technologies used during the Asian Green Revolution resulted in local agro-ecosystems degradation and increased environmental risks (Holt-Gimenez 2006). In Punjab, India, home of the Green Revolution, 80% groundwater was detected under the 'overexploited or critical' condition (Sengupta 2006), forcing a large number of farmers to give up farming or return to traditional dryland farming (Sharma 2000). Since Africa is already under unfavorable agro-ecological conditions, a green revolution might lead to further environmental problems. Besides, studies found that the Asian Green Revolution had limited impact on food security enhancement and poverty alleviation despite the growth in food productivity (Pingali 2012), but resulted in income inequality among different classes of farmers (Niazi 2004).

3.2 Are Imports and Food Aid Efficient to Enhance Sub-Saharan Africa's Food Security?

Over the past five decades, food aid and food imports have played a significant role in food insecurity alleviation in Africa (Verheye 2010). According to the World Food Program Food Aid Flows Report (2012), global food aid deliveries reached 5 million mt in 2012, with 63% of the aid allocated to Sub-Saharan Africa. Even though a large amount of food aid flowed into Africa, chronic food insecurity is still prevalence in the region, suggesting that food aid was not as effective as expected. This is because food aid led to depressed food price which distorted the market and generated a negative impact on local food production (Nunn 2010).

The same with food imports, which have increased in the past four decades, prevented Africa from achieving food independence (Graaff, Kessler, Nibbering 2011). Luan, Cui, and Ferrat's study (2013) supported the same argument with the facts that Africa's food self-sufficiency has been declining from 1960 to 2007, which is not only due to the rapid population growth, but also the food imports have been used as the main solution to food deficit in recent years.

On the other hand, others argue that there is no correlation between the receipt of food aid and decreases in local agriculture production (Diriye, Nur, and Khalif 2013). Mabuza et al.'s study (2009) found that there was no significant negative correlation between food aid received and the maize price and production in Swaziland. Additionally, by analyzing household-level data from rural Ethiopia, Abdulai, Barrett and Hoddinott's study (2005) indicated that food aid not only did not constrain food production, but have mildly stimulated African agricultural productivity.

Although no agreement has been reached on food aid's impact on food production, most studies agree timely and well managed food aid is beneficial in short-term emergency situations, when market is incapable to function (Del Ninno, Dorosh, and Subbarao 2007, Diriye, Nur, and Khalif 2013). However, when dealing with short-term emergencies, it should be integrated into market-based strategies with well-established targeting and monitoring systems to ensure effectiveness (Christensen, 2000). According to Devereux (2016), food aid should be complemented with cash transfers and applied accordingly based on different situations. It might be more efficient if the transfers are delivered partly in cash and partly in food, or provided in the form of vouchers so that access to food is guaranteed without distorting markets.

Since food aid is not the solution for a long-term food security, achieving food self-

sufficiency is regarded as vital for Africa as it will increase local resilience against food crisis and improve the overall local livelihoods (Munang and Nkem 2011). According to Munang and Nkem (2011), actions targeted on small-scale food systems could let Africa achieve food sufficiency, and at the same time, distribute the benefits much more evenly across different classes of farmers.

3.3 Achieving Food Security in the Face of Climate Change

According to the Intergovernmental Panel on Climate Change (IPCC), due to Sub-Saharn Africa's geographical location, the region is the most venerable area in the world. As mentioned in the previous section, climate change has a great impact on all dimensions of food security if no measurement is taken. Therefore, figuring out how to achieve food security in the face of climate change is extremely important. In 2012, the Consultative Group for International Agricultural Research (CGIAR) identified key recommendations based on scientific evidence, which provided guidance to policymakers. The recommendations are[9]:

- Integrate food security and sustainable agriculture into global and national policies;
- Significantly raise the level of global investment in sustainable agriculture and food systems in the next decade;
- Sustainably intensify agricultural production while reducing GHG emissions and other negative environmental impacts of agriculture;

[9] Beddington J, Asaduzzaman M, Clark M, Fernández A, Guillou M, Jahn M, Erda L, Mamo T, Van Bo N, Nobre CA, Scholes R, Sharma R, Wakhungu J. 2012. Achieving food security in the face of climate change: Final report from the Commission on Sustainable Agriculture and Climate Change. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark. Available online at: www.ccafs.cgiar.org/commission.

- Develop specific programmes and policies to assist populations and sectors that are most vulnerable to climate changes and food insecurity;
- Reshape food access and consumption patterns to ensure basic nutritional needs are met and to foster healthy and sustainable eating patterns worldwide;
- Reduce loss and waste in food systems, targeting infrastructure, farming practices, processing, distribution and household habits;
- Create comprehensive, shared, integrated information systems that encompass human and ecological dimensions.

These seven recommendations are considered comprehensive as they cover policy, investment, appropriate agricultural practices, targeting, nutrition, food waste and information management. All of the recommendations listed above are complemented by detailed action plans.

4. How does the Donor Community Address Food Insecurity in Sub-Saharan Africa?

After understanding the academic points of view in food security enhancement, it is also important to learn how the donor community addresses the issue, since donors play a key role in setting priorities in food security programs and taking actual actions. Currently, there are mainly two types of food aid—relief food aid, an in-kind aid whereby donor countries distribute food or transfer cash to recipient countries; and the project food aid which aims at delivering food benefits as part of a specific project. (Shah, 2010).

4.1 Relief Food Aid

Relief food aid, used to be mainly surplus of donor countries, has been regarded as problematic in achieving long-term food security goals but may be effective in response to emergencies as mentioned above. Figure 5 shows the major donors in relief food aid from 1988 to 2008. From the graph, the U.S. has been the largest donor in the field, contributing to more than half of the food aid.

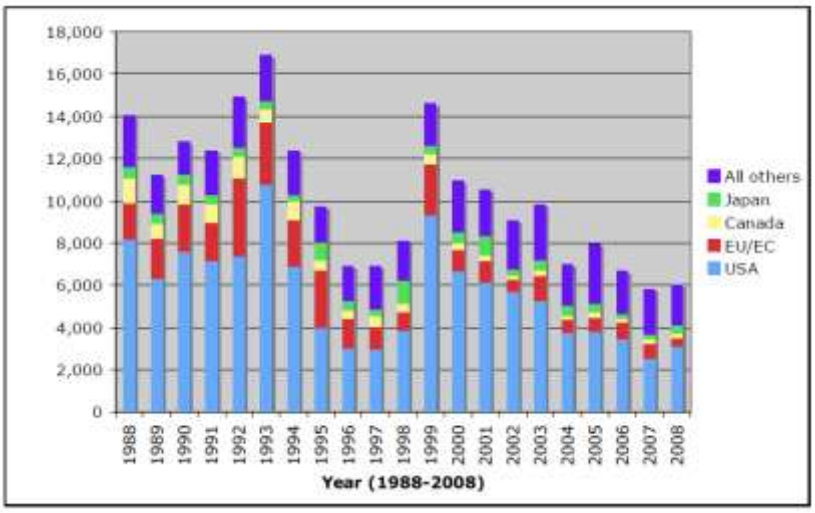

Figure 5. Food aid by donor (including bilateral and WFP donations), 1988–2008[10]

The U.S. relief food aid policy has been relying on tied aid and monetization, although there has been a trend towards releasing restrictions and allowing for more local purchase and cash assistance. However, the U.S. relief food aid remains subject to geopolitical objectives and economic strategies that aims to meet the U.S. military and political needs and help American agricultural producers find markets (Essex, 2010).

In comparison, all other international relief food aid donors allow completely or partially untied aid (Kneteman, 2009). Take the European Union (EU) as an example, as the second

[10] Essex, J. (2010). Sustainability, Food Security, and Development Aid after the Food Crisis: Assessing Aid Strategies across Donor Contexts. Sustainability, 2(11), 3354–3382.

largest donor, although EU provided much less relief food aid than the U.S., it maintains a policy of untied aid in the form of cash, and directs all of its aid through international organizations or NGOs. Besides, the EU also strongly relies on local purchase and demand-driven allocation and programming strategies[11].

4.2 Project Food Aid

Due to the relief food aid's ineffectiveness in achieving long-term food security goal, the relief food aid has been declining from 20% of global aid flows in 1960s to only 5% in 2007 (Shah, 2007). On the other hand, project food aid has been increasing throughout the years since it could deliver multi-benefits and generate greater impacts. To illustrate donor community's focus in project food aid, how the United States, the European Union, the Rockefeller Foundation and the Bill & Melinda Gates Foundation set their priorities are discussed below. The reason of selecting these entities is that they are not only major donors in the field, but also could represent both governmental and private donors.

4.2.1 United States

The U.S. is also an active project food aid donor in Sub-Saharan Africa to enhance the region's food security. The United States Agency for International Development (USAID) is the lead U.S. Government agency that administrates foreign aid and implements international programs. To help with Sub-Saharan Africa's food security, the USAID has been focusing on investing in agricultural research, developing agricultural markets, helping farmers get access

[11] Essex, J. (2010). Sustainability, Food Security, and Development Aid after the Food Crisis: Assessing Aid Strategies across Donor Contexts. *Sustainability*, *2*(11), 3354–3382. http://doi.org/10.3390/su2113354

to capital, offering extension services, developing sustainable agriculture strategies, and providing emergency food assistance. Throughout the years, the USAID has carried out two initiatives focusing on food security, respectively Feed the Future and the New Alliance for Food Security and Nutrition. Feed the Future, launched in 2009 during the G-8 Summit, targets smallholder farmers, especially women. By developing participating countries' agriculture sectors, the initiative aims at increasing incomes, reducing hunger, poverty and undernutrition. Three years after the launch of Feed the Future initiative, New Alliance for Food Security and Nutrition was developed. While as the Feed the Future focuses on the public sector, the New Alliance partnership was designed to increase private sector investment in African agriculture.

Along with achieving the food security goal, the USAID pays great attention to environmental impacts. Thus, it has developed a series of sustainable agriculture strategies so that countries can feed their populations without depleting their natural resources. Specifically, the USAID promotes sustainable intensification practices that could improve soil quality, minimize the use of pesticides and herbicides, ensure proper treatment of solid waste, manure, waste water, and agricultural chemicals, and protect biodiversity while enhancing agricultural productivity. In 2015, the U.S. launched the Climate Services for Resilient Development program, which established a $34 million public-private partnership that provides actionable science, data, information, tools, and training to developing countries to strengthen their climate resilience (The White House 2015). Between 2010 and 2014, the U.S. contributed nearly $400 million to climate adaptation programs specifically in Africa, all of which were in the form of grants, with an additional $400 million to adaptation-related multilateral climate funds that benefit the world (The White House 2015).

In addition to aid relief, the U.S. also provided climate data to African regional organizations so that African countries could better understand and plan for climate change. The National Aeronautics and Space Administration (NASA)'s high-resolution downscaled climate projections are critical in planning for the impacts of changing precipitation and temperature patterns at a national and sub-national level, while the USAID's Famine Early Warning System (FEWS NET) provides climate data, software tools, and training to strengthen East African countries' capacities to adapt to climate change. Moreover, the U.S. National Oceanic and Atmospheric Administration extends the range of extreme weather forecasts from 14 days to up to 30 days, increasing the capacity to prepare for the climate-related hazards (The White House 2015).

4.2.2 The European Commission

The European Commission has a long history working in the field of food and agriculture across the world. In 2010, the commission reported that aid addressing food insecurity in Sub-Saharan Africa reached $781 million. To guide its practices in the field, EU has developed the EU policy framework on food security in 2010 to make sure food security, nutrition and sustainable agriculture are among the EU's key priorities for development cooperation. The EU policy framework on food security includes a comprehensive strategy that concentrates on 1) improving smallholder resilience and rural livelihoods; 2) supporting governance mechanisms that address food insecurity; 3) supporting regional agriculture and food security policies; and 4) strengthening assistance mechanisms for vulnerable population groups (EU Commission, 2011).

The Food Security Thematic Programme (FSTP) is one of the food security programs the EU operates. The programme addresses structural causes of food insecurity, with an emphasis on developing sustainable solutions. The programme sets three priorities--research, technology transfer and innovation to enhance food security, strengthened governance approaches for food security, and addressing food security for the poor and vulnerable in fragile situations.

Within its food and nutrition security activities, the EU has been placing sustainable agriculture as one of its main focus. In its 2010 policy framework on food security, it specifically mentioned that sustainable small-scale food production should be the focus to increase availability of food in developing countries.

Together with other donors, the EU also supports the Comprehensive Africa Agricultural Development Programme (CAADP). Launched in 2003, the CAADP is Africa's policy framework for agricultural transformation, wealth creation, food security and nutrition, and economic growth.[12] Within CADDP's eight flagship programs, five have a direct focus on sustainable agriculture or climate change, while the other three are capacity building programs that involve disseminating the knowledge of sustainable agriculture.

4.2.3 The Rockefeller Foundation

The Rockefeller Foundation promotes the well-being of humanity throughout the world by advancing inclusive economies and building resilience from acute shocks and chronic stresses. Agriculture and food security is a major focus of the Rockefeller Foundation. Over the past few decades, the Foundation has transformed its strategy from focusing on increasing

[12] Source: About CAADP. (2015, October 12). Retrieved May 2, 2016, from http://www.nepad-caadp.net/about-us

the wealth of farmers to improving the nutritional content of food and increasing the yield of staple crops, followed by catalyzing a uniquely African Green Revolution[13]. Currently, the Foundation is building on its previous work to address food waste and loss.

YieldWise and Alliance for a Green Revolution in Africa (AGRA) are the two food security initiatives the Foundation is currently working on. YieldWise, a $ 130 million initiative launched in 2016, aims at demonstrating how the world can halve food loss by 2030. Still at the early stage, the initiative focuses on reducing the loss in fruits, vegetables, and staple crops in Kenya, Nigeria, and Tanzania by fixing the broken links in the chain from farms to markets in African communities, helping farmers get access to technologies and solutions to curb preventable crop loss, investing in financing models and technology innovations that drive mutual economic growth, and engaging global businesses to account for the food lost and waste in their supply chains, even beyond their own factories.[14] Private sector is a key player in this initiative.

AGRA, launched by the Rockefeller Foundation, the Bill and Melinda Gates Foundation and other organizations in 2006, works to establish partnerships, foster access to markets and finance, and develop and disseminate innovations so that the entire agricultural value chain could be strengthened.[15] The program sees safeguarding the environment as important as increasing agricultural productivity and local income.

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[13] Source: Agriculture and Food Security. (n.d.). Retrieved May 2, 2016, from https://www.rockefellerfoundation.org/our-work/topics/agriculture-and-food-security/

[14] Source: YieldWise. (n.d.). Retrieved May 2, 2016, from https://www.rockefellerfoundation.org/our-work/initiatives/yieldwise/

[15] Source: Alliance for a Green Revolution in Africa. (n.d.). Retrieved May 2, 2016, from https://www.rockefellerfoundation.org/our-work/initiatives/alliance-for-a-green-revolution-in-africa/

4.2.4 Bill & Melinda Gates Foundation

The Bill & Melinda Gates Foundation addresses food security through its agricultural development and nutrition initiative. Up to now, the foundation has contributed more than $2 billion to agricultural development, primarily in Sub-Saharan Africa and South Asia. When conducting activities, the foundation follows the following strategies: 1) listening to farmers and addressing their specific needs; 2) increasing farm productivity; 3) fostering sustainable agricultural practices; and 4) achieving greater impact with partners.

The Nutritious Food Systems Initiative, operated by the Agricultural Development and Nutrition team, is to ensure equitable access to safe, affordable, and nutritious diets year-round. The initiative focuses on improving data, evidence, and policy, empowering women in agriculture, increasing supply and affordability of nutrient-rich foods, reducing seasonal fluctuations, increasing demand, and improving food safety.

The goal of the Gates Foundation is "to reduce hunger and poverty for millions of farming families in Sub-Saharan Africa and South Asia by increasing agricultural productivity in a sustainable way", which shows the commitment the foundation made in integrating environmental sustainability into its agricultural development plans.

4.3 A Summary of Donor Community's Policies and Approaches

There is a general consensus among the donor community that food security should be addressed in their complexity, not just focusing on food production, but taking social and political power on food outcomes into account (Essex, 2010). All of the donors mentioned above have a focus on supporting smallholder agriculture to achieve food security, with an

emphasis on empowering women. Also, there is an emerging trend in engaging private sector to provide financial and technical support to food security. As private foundations, the Rockefeller Foundation and the Bill & Melinda Gates Foundation have already been working in the field and generating great impacts. Take the Gates Foundation as an example, the foundation not only contribute more aid than some countries in the world, but also affected other charities and organizations to direct their resources. To respond to the foundation's bet which is to end hunger in the next 15 year, many celebrities have already replied with support, from the food-movement chef Jamie Oliver to the Bush/Ralph Lauren family.

5. Whether Donor Community Priorities Match the Solutions Proposed by the Academia?

In general, the stated policies and approaches of the donor community correspond to what proposed in the academia. From the analysis above, different donors' activities complement to each other while together they addressed all seven recommendations proposed by the CGIAR. However, donors may have their own goals to achieve apart from purely the recipient countries' development and humanitarian objectives.

Moreover, according to the academia, relief food aid are problematic in achieving long-term food security, however, it still remains as one of the major forms of food aid, although the increasing trend of providing food through local purchase, transferring cash and implementing food security related projects is seen.

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